Ecosystem and population health: the role of Canadian physicians at home and abroad

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Abstract • Résumé

Seemingly intractable problems of overpopulation, ecologic degradation, diminishing resources and regional warfare are having a profound effect on global population health. Canadian physicians can assist in ameliorating these problems by helping to modify the overconsumption of natural resources at home and by participating in international health projects focused at the community level, where the health of individuals and that of their environment intersect. The author describes the work of the Canadian Hunger Foundation in Vietnam and Sri Lanka, where a team of professionals worked with local farmers to improve the local water supply, decrease soil erosion and increase food production. The team observed changes in the physical health of communities that resulted in part from interventions that empowered them to address their own problems.

La surpopulation, la dégradation de l'environnement, l'épuisement des ressources et les guerres régionales, problèmes qui semblent insolubles, ont une incidence profonde sur la santé des populations du monde. Les médecins du Canada peuvent aider à atténuer ces problèmes en aidant à modifier la surconsommation des ressources naturelles au Canada et en participant à des projets internationaux sur la santé au niveau local, carrefour de la santé des individus et de celle de l'environnement. L'auteur décrit le travail effectué par la Fondation canadienne contre la faim au Vietnam et au Sri Lanka, où une équipe de professionnels ont collaboré avec des agriculteurs locaux pour améliorer l'approvisionnement en eau local, réduire l'érosion des sols et augmenter la production d'aliments. L'équipe a observé, dans la santé physique des communautés, des changements découlant en partie d'interventions qui ont donné aux communautés les pouvoirs nécessaires pour régler leurs propres problèmes.

At a time when the role of physicians is being challenged and redefined in our most fortunate of nations, it is perhaps fitting to reflect on the contribution that Canadian physicians can make internationally. As our century draws to a close, and with it an era in which limitless progress was offered by increasingly specialized endeavours across a broad spectrum, we might reflect on the role that generalist physicians can play in addressing the seemingly intractable problems associated with environmental degradation, diminishing resources and regional warfare that have come as the inevitable consequence of technologic innovation combined with an increasingly narrow view of social responsibility.

As these problems become more complex the generalist's perspective will become more important in the search for solutions. The ability to detect the principles active in one situation and apply these to another, more complex situation is both the hallmark of the generalist and the necessary (although often not sufficient) condition for devising solutions. Although many physicians practise in highly technical areas, most have at least a basis in generalism — a view of the patient as a whole in the context of his or her life and an ability to take thoughtful action in the face of uncertainty. Good physicians spend their professional lives seeking solutions to complex problems whose full ramifications are neither known nor knowable. They must develop strategies to ensure continuous feedback and observation so that it will be evident when interventions are working and when they need to be changed. Solutions must also "fail safe" in the sense that, if they do not work, the fall-back position will be one of relative safety. It is these skills that are required to address the complex problems associated with poverty and environmental degradation. For this reason, a particular responsibility rests with physicians to work at home and abroad to assist others to

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make choices and undertake actions that will promote health and protect the ecosystem.

Few areas of problem solving are as difficult or as seemingly intractable as the overlapping domains of ecosystem and international health. That there is a relation between poverty, ecologic degradation and the health of human populations has long been known. Aside from obvious links between, say, the destruction of rain forests, global warming and the loss of potential natural medicines, the precise nature of these interconnections has eluded definition. When chaos theorists pronounced a connection between a butterfly flapping its wings in the rain forest and the development of a tornado on the prairies there was an understandable tendency to be intimidated by this level of complex interrelationship.[1] The nihilism and denial that have resulted preclude understanding and effective action and have been prominent features of scientific and political leadership in the late 20th century. Nor have physicians provided consistent leadership, despite the fact that in everyday practice they apply an equally complex model — the biopsychosocial conception of health — in making decisions and offering advice. Physicians see their patients as being embedded in their communities, where their health is largely dependent on their relationships with other people and with the environment in which they live. We might extend this idea and see communities as being embedded in their sustaining ecosystems.

"Community" can be defined in global, national or local terms. Given the global interconnectedness and the common features of human and other populations, it would seem most useful for our understanding to begin at the community level. Working with communities, whether at home or abroad, provides an opportunity to observe how various human communities organize themselves (or don't) to solve common problems; the knowledge gleaned from successful problem solving can often be applied to new situations in which community health is threatened. This is true whether the problem is one of resource depletion and poverty in developing countries or of ecologically unsustainable consumption in our own communities in Canada.

Physicians have a long and generally laudable history of reaching beyond the confines of their own societies to serve others. Judged by today's standards some of these efforts were misdirected, but only rarely were they ill intended. The medical profession has served a number of roles, including providing direct medical services, organizing the provision of medical services, researching and promoting an understanding of the factors that influence health, promoting an understanding of needs (e.g., as Albert Schweitzer did), acting to meet needs and inspire others (e.g., as Norman Bethune did) and, sadly, bearing witness (e.g., as Médecins sans frontières are doing in Rwanda).

The therapeutic alliance

Another long-standing but only recently articulated role of physicians is to forge a therapeutic partnership with the patient. This must be seen as more than a one-way donation of help. Rather, it is a mutual exchange, the fundamental intent of which is to help patients help themselves. In the process physicians learn much that can help them be more effective. By analogy, a community or a population can be seen as a "patient." And, like many patients, communities and populations may be subject to the forces of poverty and ignorance or, as in much of Canada, the effects of overconsumption.

Most physicians appreciate that the health of individuals improves when the health of their communities is enhanced. Physicians are privileged to be called upon frequently to provide leadership on behalf of their communities; whether this relates to planning recreational facilities, setting school board priorities, devising stop-smoking campaigns or other initiatives, the pattern is similar: community resources are drawn together to provide an effective response to a challenge. The interdependence of individuals and their communities is often underscored by the significant improvements in health brought about by patients' active involvement in community ventures.

Social responsibility

Physicians have a long-standing responsibility to influence environmental factors that influence their patients' health. The insight we gain from working with people from various cultures (both in Canada and abroad) can help us to grasp the implication of our own use of resources. We are all ultimately and equally dependent on the ecosystem called Earth for our own survival and that of future generations. North Americans are consuming resources and producing wastes at a rate far in excess of what the earth can support.[2–4] We are currently insulated from that reality by economic and world trade arrangements that allow the land that sustains our lifestyle to be scattered around the globe. For example, our breakfast tea may be produced on Sri Lankan land appropriated from subsistence farmers. If we gathered together all such bits of appropriated land, we would see that the average Canadian uses over 4 hectares of land to support his or her lifestyle, whereas our world contains only 1.3 hectares of land per capita, of which only 0.25 hectares are arable.[3] If all of the people in the world consumed resources at the rate of the average North American we would need two extra planet Earths to support us.

If we are to preserve the global ecosystem on which we all depend, the reduction of resource consumption by wealthy nations such as Canada is at least as impor-

tant and urgent as the preservation of ecologic, economic and community health in poorer nations. There is good evidence that this reduction can be achieved without adverse effects on our health.[5] Plotting life expectancy against per capita income demonstrates that nations with a fraction of Canada's per capita income can achieve a comparable degree of health; very little gain in longevity is associated with an increase in per capita income above a level approximately one quarter of the per capita income of Canada. More rational transportation, employment and community design policies[2] coupled with effective social structures[6] could effect huge reductions in resource consumption and waste production. Evidence that Canadians are willing to face up to these issues is less forthcoming.

Ecologic and population health

In much of the developing world, population pressures and the use of inappropriate farming practices have combined to inflict major ecologic damage by reducing forest cover, destroying habitats and compromising soil quality. This in turn has accentuated a downward cycle of poverty, hunger and even more desperate pressure on land — what Garrett Hardin[7] referred to in the 1960s as "the tragedy of the commons." The incremental effects of the rational choices made by each family in order to survive leads to an ecologically unsustainable situation in which the land base on which they all depend is gradually destroyed. Increasing scarcity of fuel stocks and clean water place an even greater burden on women, who must find alternative fuels and travel farther for water while they and their families suffer from malnutrition, waterborne diseases and respiratory diseases secondary to poor indoor air quality caused by poor fuel.

On the surface the problem is, paradoxically, both simple to resolve and intractable. As Hardin and others before him have pointed out the basic solution is to reduce our population and thus our demand on the land. Although technical innovation and the rapid development of the New World have to some degree forestalled a Malthusian catastrophe, the fact that the world's population continues to increase exponentially despite the massive population control programs described at the United Nations Population Conference in Cairo, Egypt, in 1994 illustrates the intractability of the problem.

Despair and nihilism are not easy companions for physicians and committed international-development workers. Nor are they luxuries any of us can afford if we wish to avert a catastrophic, reciprocal degradation of the global ecosystem and human health. We must work at the community level to reverse this trend so that the ecosystem and human health become mutually reinforcing rather than mutually destructive.

I recently went to Vietnam and Sri Lanka on behalf of the Canadian Hunger Foundation, a nongovernmental organization dedicated to development through the principles of self-help and the empowerment of women. Our aim was to work with a number of community-based organizations to review and enhance the agricultural practices of farmers in marginal and dry-land areas. For example, integrated projects in Vietnam will help to organize water-supply systems to be maintained by local women. A "cow bank" will be established to enable more families to have draught animals. At the same time regional (and ultimately local) expertise will be developed to help farmers adopt more sustainable agricultural practices, such as land terracing using nitrogen-fixing plants for soil retention, intercropping with quickly maturing sustenance foods, fruit-tree and nut-tree planting for medium-term support and effective agroforest practices for the long term.

These integrated activities frequently need a catalyst, and this can often be found if the community can be assisted to organize itself around particular tangible purposes such as building a community water-supply system or a local school.

Any physician who has done community work in Canada or elsewhere will readily understand the very positive health benefits associated not just with the provision of clean water but also with the sense of empowerment that people gain when they work together to solve their own problems. No one with expertise in population dynamics will be surprised that birth rates drop when the status of women and the cohesiveness of a community are enhanced,[8] an incremental advance toward the "simple" solution of population control.

Antidotes to despair

Generalist physicians working in cooperation with professionals abroad can help to weave complex variables into a coherent picture of how a human population and the ecosystem in which it is embedded can sustain one another. They can then act as advocates for the adoption of policies and measures that will maintain this symbiotic relationship.

In cooperation with other organizations, the Canadian Hunger Foundation has developed ecologically sound practices that have direct and immediate positive effects on the health of individuals. The development of household biogas units to harvest methane from cow dung for use as cooking fuel is one such example. Dried, unprocessed cow dung used as fuel releases methane (a powerful "greenhouse" gas) into the atmosphere; in addition, the nitrogen compounds it contains pollute indoor air rather than being used to fertilize fields. Through the cooperative efforts of local nongovernmental organiza-

tions, designers, local builders, small-scale manufacturers and, most important, villagers, approximately 100 000 household biogas units have been established. This has led to the improvement of indoor air quality, a dramatic reduction in the incidence of respiratory diseases among women and children and the liberation of women from approximately 4 hours of labour, i.e., half the total food preparation time (Tom Taylor, associate executive director, Canadian Hunger Foundation: personal communication, 1995). The nitrogen-rich slurry recovered from the units is used to fertilize crops, and, because the seeds it contains are killed during processing, the need for weeding is reduced. This reduction of the time and health burdens borne by women has enhanced their ability to participate in the economic and political life of the community. Such enhancements of women's status have been demonstrated in many countries to be associated with significant increases in population health and a reduction in the birth rate.

The Canadian Hunger Foundation in conjunction with nongovernmental organizations in developing countries sponsored a symposium in Colombo, Sri Lanka, in April 1995 that brought together front-line community-development workers from four continents. Field trips to communities in the dry zone facilitated hands-on "lessons-learned" discussions. Sharing the practical experience gained from local projects can provide a powerful antidote to the despair that often arises from daily news reports of environmental and political disasters. Canadian physicians have the opportunity and the responsibility to provide such an antidote on behalf of their "patients" at home and abroad, whether through service, leadership, education or financial support: the opportunities are limited only by our imagination.

Although specialist physicians play an indispensable role in many areas of international medicine, generalists can and must assist with the complex problems faced by developing nations. In their day-to-day work they forge therapeutic partnerships with their patients, their communities and other professionals to address the complex problems that lead to ill health. Effective generalists are marked by their ability to identify those factors of major relevance to episodes of health and disease, marshal those forces that can improve the situation and help patients adapt to circumstances that cannot be changed. They must decide what signs, symptoms or tests will support a course of action, but must often make clinical decisions in the face of uncertainty. Even while they adhere to the Aesculapian dictum, "First, do no harm," they cannot excuse inaction by pleading that the situation is not clear. Knowledge is rarely complete and "paralysis by analysis," long a feature of environmental regulation, is not a luxury available to the average family physician confronted with a patient in need.

In few places is this situation more evident and the call for action more clear than in the interlinked domains of ecosystem and international health. Our duty is plain, our ability challenged, our success uncertain: sounds like another day in the office.

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